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(54) **MEDICAMENTS AND METHODS FOR TREATING MESOTHELIOMA**

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(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

7,118,740 B1 10/2006 Russell et al.  
9,023,643 B2 5/2015 Gauvrit et al.

**FOREIGN PATENT DOCUMENTS**

WO 02/23994 3/2002  
WO 2009/047331 4/2009

**OTHER PUBLICATIONS**

Hegmans et al. Immunotherapy of Murine Malignant Mesothelioma Using Tumor Lysate-pulsed Dendritic Cells. American Journal of Respiratory and Critical Care Medicine, vol. 171, No. 10 (2005), pp. 1168-1177.\*

Gregoire et al. Anti-cancer therapy using dendritic cells and apoptotic tumour cells: pre-clinical data in human mesothelioma and acute myeloid leukaemia. Vaccine, vol. 21, Issues 7-8, Jan. 30, 2003, pp. 791-794.\*

Bramwell, V.W. et al., "The rational design of vaccines," DDT Drug Discovery Today (2005) 10(22):1527-1534.

Ebstein, F. et al., "Cytotoxic T cell responses against mesothelioma by apoptotic cell-pulsed dendritic cells," Am. J. Resp. Critical Care Med. (2004) 169(12):1322-1330.

Gauvrit, A. et al., "Measles virus induces oncolysis of mesothelioma cells and allows dendritic cells to cross-prime tumor-specific CD8 response," Cancer Res. (2008) 68(12):4882-4892.

Gregoire, M. et al., "Immunotherapy and malignant mesothelioma: clinical perspectives," Bulletin du Cancer (2007) 94(1):23-31.

McDonald, C.J. et al., "A measles virus vaccine strain derivative as a novel oncolytic agent against breast cancer," Breast Cancer Research and Treatment (2006) 99(2):177-184.

Peng, K.W. et al., "Oncolytic measles virotherapy for ovarian cancer," Cancer Gene Therapy (2004) 11(12):846.

Peng, K.-W. et al., "Intraperitoneal therapy of ovarian cancer using an engineered measles virus," Cancer Res. (2002) 62(16):4656-4662.

Vidal, L. et al., "Reovirus and other oncolytic viruses for the targeted treatment of cancer," Targeted Oncology (2006) 1(3):130-150.

Zhu et al. (2006) 701-711.

International Search Report and Written Opinion for Application No. PCT/EP2008/063626 dated Jan. 13, 2009 (17 pages).

Hilleman et al., Development and evaluation of the Moraten measles virus vaccine, JAMA, 1968, 206(3): 587-590.

Aldjandhami, I. et al., Attenuated measles virus as a therapy for thoracic malignancies. Poster contribution TP112 at Thoracic Society of Australia and New Zealand Annual Spring Meeting 2007, Respiriology (2007) 12, Suppl. I: A30-A78.

United States Patent Office Action for U.S. Appl. No. 12/682,457 dated Apr. 27, 2012 (7 pages).

United States Patent Office Action for U.S. Appl. No. 12/682,457 dated Oct. 5, 2012 (8 pages).

United States Patent Office Final Rejection for U.S. Appl. No. 12/682,457 dated Jul. 5, 2013 (8 pages).

United States Patent Office Action for U.S. Appl. No. 12/682,457 dated Dec. 20, 2013 (6 pages).

United States Patent Office Action for U.S. Appl. No. 12/682,457 dated Aug. 1, 2014 (5 pages).

United States Patent Office Notice of Allowance for U.S. Appl. No. 12/682,457 dated Jan. 9, 2015 (9 pages).

Nashida, Yuji et al., "Development of a Dendritic Cell Vaccine Against Measles for Patients Following Hematopoietic Cell Transplantation," Transplantation, vol. 82, No. 8, Oct. 27, 2006, pp. 1104-1107.

\* cited by examiner

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(57) **ABSTRACT**

The present invention relates to the use of at least one attenuated measles virus for the manufacture of a medicament intended for treating malignant mesothelioma in an individual.